Chapter 7

Horizontal Alignments

7.1 Objectives

- Create and store horizontal chains using graphical tools.

7.2 Definitions

The **Horizontal Alignment** tools enable the user to create or modify horizontal geometry elements. Spirals, curves, tapers, and ramps can all be placed according to user-defined parameters.

7.3 Accessing

The **Horizontal Alignment** tools can be accessed from the menu **Applications>>Geopak Road>>Geometry>>Layout Alignments Horizontal**, from the **Horizontal Alignment** icon, or from the **Horizontal Alignment** button on **Project Manager**.

When the **Horizontal Alignment** tools are started for the first time, the dialog shown to the right will appear. The user has the option to select the **COGO Element Based (New)**, or the **Graphic Element Based Horizontal Alignment** tools.
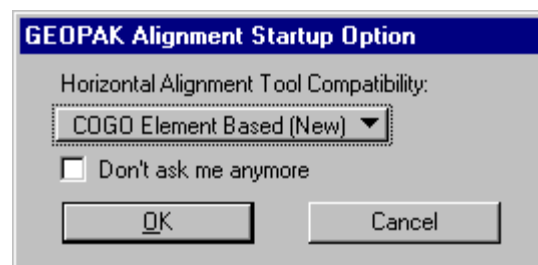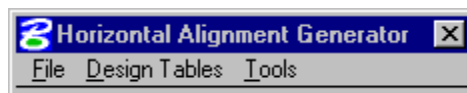
The **COGO Element Based** tools write the created elements directly into the coordinate geometry database (.gpk) as cogo elements. For this option, a Geopak COGO session must be active.

The **Graphical Element Based** option first creates Microstation graphical elements in the .dgn file. The user then has to store these elements as a COGO element in the coordinate geometry database (.gpk).

If the Don't ask me anymore toggle is set, the user will not see this dialog when going into the **Horizontal Alignment** tools.

** Note: It is recommended to use the **COGO Element Based Horizontal Alignment** tools. The **COGO Element Based Horizontal Alignment** tools will allow the user to better achieve an efficient, accurate design. Only the **COGO Element Based Horizontal Alignment** tools will be discussed in this class.

When the **COGO Element Based Horizontal Alignment** tools are chosen, the following dialog will open.
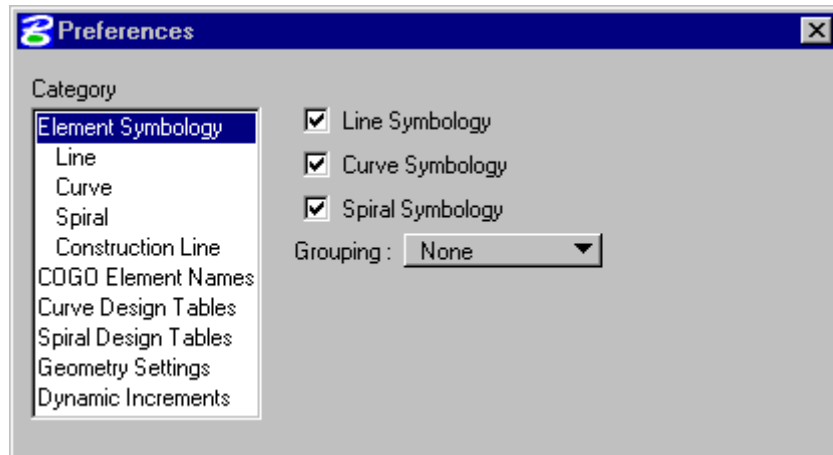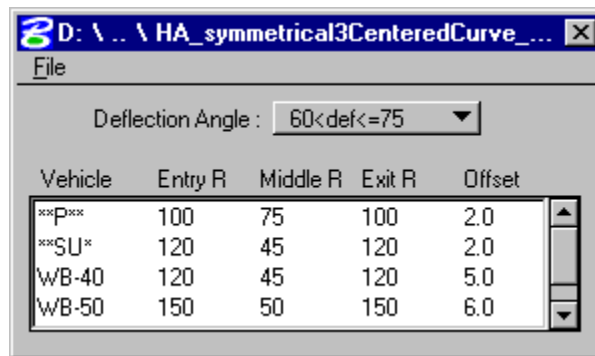
7.4 Dialog

The **Horizontal Alignment Generator** dialog has three menus, **File**, **Design Tables**, and **Tools**.

The **File** menu opens the following dialog which allows the user to change various preferences such as element symbology, beginning element names, curve vehicle tables, curve definition and dynamic increments.

Design Tables allows the user to set up Design Tables for Symmetrical 3 Centered Curves, Asymmetrical 3 Centered Curves, Taper Curves, and Spiral Curves. Entry, middle, and exit radiuses can be set up for various vehicle types and deflection angles.

The **Tools** menu allows access to the Main tool dialog, or to any of the tool boxes to store a Horizontal Alignment.

7.5 Lines/Curves Tools

The **Line/Curves** tools allow the user to place line and curve elements by various methods. The **Line/Curves** toolbox contains the following tools.

Store Line By 2 Points – stores a line and its endpoints.

Store Tangent Line – stores a line tangent to a curve and the endpoints of a line.

Store Curve By 3 Points – stores a circular curve by selecting the beginning and ending points of the curve, and a point on the curve.

Store Curve By Center – stores a circular curve by defining the center point, radius, and sweep angle.

Store Tangent Curve Unconstrained – places a curve tangent to a line or curve, and through a specified point.

Place Curve Between Two Elements – places a circular curve between two elements.

Place Simple Transition – draws a tangent, curve, or spiral between two arcs.

7.6 Curve Combination Tools

The **Curve Combination Tools** allows the user to place compound curves, three centered curves, reverse curves, and tapered curves.

Place Compound Curves – places a compound curve between two elements.

Place Three Centered Curves – stores a three-centered curve between two elements. Design vehicle parameters from File>>Preferences can be utilized.

Place Reverse Curves – stores reverse curves between two elements. A short tangent section between the curves can also be specified.

Place Taper Curves – places a curve and tapers between two elements. The design vehicle parameters from File>>Preferences can be utilized.

7.7 Spiral Combinations

The **Spiral Combinations** tools allow the user to place spirals with curves, tangents, and other spirals.

....**Place SC Tangent To Line** – stores a spiral curve combination tangent to a specified line.

Place ST Tangent To Curve - stores a spiral tangent combination tangent to a curve.

Place SC Tangent To Curve – stores a compound spiral curve combination tangent to a curve. The spiral will be placed between the curves.

Place SCS (Intersecting Elements) – stores a spiral curve combination tangent to a line.

Place STS (Disjoint Curves) – stores a spiral tangent spiral combination between two curves.

Place SCS (Disjoint Curves) – stores a spiral curve spiral combination between two curves.

7.8 Complex Transitions

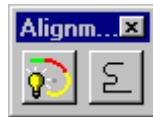The **Complex Transitions** tools allow the user to place complex ramp designs.

Place Complex Ramp – places simple to complex ramp geometry.

Place Ramp Connector – places simple to complex ramp connector.

7.9 Alignment Tools

The **Alignment Tools** allows the user to either store an alignment from existing COGO elements or to dynamically place an alignment.

Place Dynamic Element – places an alignment dynamically. The user needs to select a starting element and then specify the length of curves and length of tangents to create the alignment. The degree of curvature can be changed, and spirals can be added as the user moves along the alignment.

Store Chain – stores an alignment by selecting graphical elements. This tool works similar to the Microstation Automatic Create Complex Chain tool.

7.10 Manipulate Tools

The **Manipulate** tools allow the user to move/copy, rotate, extend, and delete elements.

 Move Plan View Element - moves or copies an element.

 Rotate Plan View Element - rotates the element about a specified point.

 Extend Plan View Element – extends or shortens any cogo element.

 Delete Element – deletes an element from the coordinate geometry database (.gpk).